

Perigynia glabrous.

Carex impressa (Wright) Mackenzie.

Specimens examined, all from the herbarium of Mr. K. K. Mackenzie.

INDIANA: Wells Co., C. C. Deam, May 22, 1908. Posey Co., C. C. Deam, May 23, 1911. Porter Co., C. C. Deam, June 17, 1911.

A NEW FOSSIL SELAGINELLA FROM THE LOWER TERTIARY OF MONTANA*

BY F. H. KNOWLTON

The remains of lycopodiaceous plants appear to be very rare in Mesozoic and later horizons, and when one is discovered that shows not only the foliar organs, but the fruiting organs as well in a high degree of perfection, it merits immediate description, and this is the warrant for the present publication.

The beautifully preserved specimens here described as *Selaginella* were obtained during the past summer (1915) by Mr. A. J. Collier, of the United States Geological Survey, in the northeast Montana coal field; at a point a few miles south of the international boundary, in sec. 33, T. 37 N., R. 47 E. The material in which they are preserved is a white, very fine-grained clay especially adapted to retaining even the most delicate plant structures. The plants in association with the *Selaginella* indicate that they probably grew in or very close to the body of water in which they were deposited. These comprise an alga, stems and roots of *Equisetum*, leaves and stems of coarse sedges, a fern (*Onoclea sensibilis fossilis*), a leaf apparently of *Potamogeton*, and a stem bearing whorls of leaves of what is known as *Trapa ? microphylla* Lesq. The latter specimen throws much light on the affinity of a plant that has long been imperfectly understood. It will be described and figured on a later occasion.

The *Selaginella* may be known as:

Selaginella Collieri n. sp.

PLATE I, FIGURES 1-6

Stems very slender, weak, evidently erect or suberect, probably from a decumbent base, about 2 centimeters high, pinnate, the branches alternate, close, the lower one or two compound; leaves

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on the stem of two kinds, those of the lower plane alternate, spaced, spreading, apparently rounded at apex; leaves of upper plane small (one-third the length of the others), appressed, oblong, obtuse; branchlets all fertile, apparently square, sporophylls all alike, alternate, close, overlapping, slightly setose-pointed; sporangia large, one in the axil of each bract, circular (now flattened), ornamented with numerous minute, circular elevations.

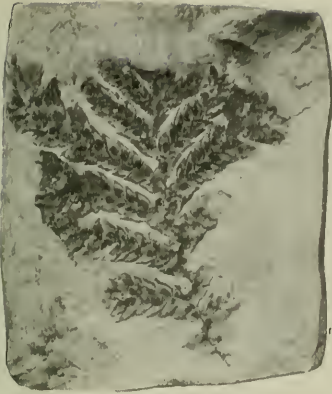
Types.—U. S. National Museum, Nos. 35,009, 35,010, 35,011.

Locality.—Northeast Montana just below international boundary (sec. 33, T. 37 N., R. 47 E.).

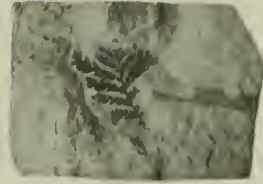
Horizon.—Fort Union formation (Eocene), from clay above a large vein of coal and about 40 feet above the base of the formation.

The working out of the probable affinity of *Selaginella Collieri* among the living species is a matter of some difficulty. As is well known, the genus is a vast one, comprising between 500 and 1,000 species, and as many of the species are very close together, and the individual variation often very considerable, an expert knowledge of the genus which the writer cannot lay claim to is really required to stabilize identifications. In the first place it may be pointed out that the fossil species appears to have little or no close relationship with any form now living in the United States or Canada, the nearest species being perhaps *Selaginella apus* (L.) Spring, but this is obviously so remote as to be negligible.

In general *S. Collieri* appears to approach most closely to *S. stenophylla* A. Br. (*S. Lyncnuchus* Tourn., Fil. Mex., p. 148, non Spreng), and especially its variety *rigidiuscula* Tourn., a native of Mexico. In some features it also resembles *S. didymostachya* (Desv.) Spreng, and *S. confusa* Spreng, both natives of Jamaica. It also suggests in the form of its branching *S. guatemalensis* Baker, from Guatemala. However, its small size, very close, densely fertile spikes and spreading leaves serve to distinguish it at once from any of those mentioned above, and it is probable that its real affinities have not been determined. It is hoped, however, that the excellent figures given may ultimately serve to allocate it.



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EXPLANATION OF PLATE I.

- FIG. 1. *Selaginella Collieri* n. sp. Natural size.
 FIG. 2. *Selaginella Collieri* n. sp. Four times enlarged.
 FIG. 3. *Selaginella Collieri* n. sp. Natural size.
 FIG. 4. *Selaginella Collieri* n. sp. Four times enlarged.
 FIG. 5. *Selaginella Collieri* n. sp. Natural size.
 FIG. 6. *Selaginella Collieri* n. sp. Four times enlarged.

